

The application of Piagetian and Neo-Piagetian ideas to further and higher education

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Piaget's theory of learning and stage theory applies to adults, as well as to children and adolescents. Some implications of this are worked out. According to Sutherland (1982) and others not all adults can be assumed to be formal operational thinkers. More than half are concrete operational (or at an even lower stage) at the age of 16. However some mature adults may develop late to the formal operational stage. Whether this is the case or not has yet to be determined empirically. The ideas of some other educational psychologists who have developed Piaget's ideas for adults are outlined and evaluated. These stem from a number of theoretical perspectives: (i) neo-Piagetian: Kohlberg, Peel and Labouvie-Vief; (ii) theorists synthesizing Piaget's ideas with those of others: Kolb, Biggs and Pascual-Leone; and (iii) others striking out in alternative directions: Perry and Gilligan. If accepted, these findings have important implications for teaching in both further and higher education. Neither can continue to assume that all students can operate at a formal operational stage. In further education and training courses teachers may need to assume that students need a practical element to their learning. In higher education teachers need to cater for some students who are concrete operational or transitional between concrete and formal operations.

While the theme of youth is flexibility, the hallmark of adulthood is commitment and responsibility. (Labouvie-Vief 1980)

Introduction

Piaget's biologically-based theory of learning and his ideas of stages in learning and have been applied to child and adolescent learners. As pointed out by Jarvis (1995) the stages as originally outlined only apply to the years of childhood and adolescence. Do they also apply to adult learners and if so, to what extent? This paper will argue that Piaget's ideas are relevant to all further and many higher educational situations. However the implications for higher education are very different from those for further education.

What is meant by an 'adult' should be defined at the outset. In the UK adulthood starts legally at 18. This is also the modal age of transition between the end of high school and the beginning of university. However the start of further education and the first employment or training is at 16. Hence there is a slight ambiguity as to the age at which adulthood commences. In this article, 16–22 year olds will be considered as

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students/apprentices; 23–39 year olds as young adults; 40–65 year olds as middle aged adults and 66+ as old adults.

Piaget's theory of learning

In this article, Piaget's theory of how learning takes place will be considered first; followed by his stages.

There is no reason to believe that Piaget's general theory of learning is any different for adults than for children. Piaget himself argued that the process was fundamentally the same for all periods (his technical term for the more colloquial 'stages'), even when they differ as drastically as do *sensorimotor* activity (such as touching a new toy) and the highly abstract *formal* aspect of *operational* thinking (such as a philosophical analysis of Hamlet's soliloquies).

There is no *a priori* reason why the process should not be the same in adult mental activity. However whether the process proceeds in the same way and at the same speed (or at all) in (say) the elderly or as in (say) 18–22 year old students is a vital question which requires empirical investigation.

According to Piaget (1950) there are two mechanisms by which people learn: new material is assimilated by the learners, whether adult or child. They then modify the new material to their previous concepts which are stored in the memory. In due course the items in the memory store are themselves changed into new material by the mechanism of accommodation. Simultaneously there must be accommodation by the learner to the realities of the outside situation.

When assimilation predominates over accommodation, the result is play-activity, detached from reality e.g. an adult on a vocational course performing unrealistic role-play. When accommodation predominates over assimilation, the result is imitation e.g. a student copying notes from the board without understanding or rote learning textbook quotations.

By a combination of the complementary processes of assimilation and accommodation, the adult learner reaches an equilibrium for his particular stage. Some forms of equilibrium are seen by Piaget as superior to others. Therefore the schemas (i.e. concepts) of the mature adult need to be established at as mature a cognitive level as possible. This may involve outside teaching and/or self-teaching by the mature adult herself. This implies a continual self-motivated search for a more advanced equilibrium.

Can anything be done to stimulate adults to move forward out of one equilibrium into a more mature one? At this time, however, it is not clear whether there are any experiences in adult life which can achieve this. Włodkowski (1985) suggested the use of games and creative problems in order to challenge adults to move from one level to another higher one. He regards adults as experienced and purposeful learners. When they experience disequilibrium, they do something appropriate to restore equilibrium at a higher level. As an example, he quotes himself when hearing about microcomputers for the first time. He immediately made a point of reading everything he could about them to overcome his ignorance.

According to Piaget's outline, should a major event upset this equilibrium, the learner has to start the process of adaptation all over again to reach a new equilibrium. For babies a major new event is the onset of language. The baby then starts to move from sensori-motor to pre-operational thinking. A major event at the onset of adolescence is the start of puberty. However it is not yet clear if there is any correlation

between the first physiological changes of puberty and the start of formal operational thinking. The evidence of Sutherland (1982) and Shayer *et al.* (1976) would tend to deny this.

It is implied by Piaget's highly biological outline that the causes of transition into a higher stage are biological phenomena such as the initial maturation of the speech organs, a similar maturation of the relevant part of the cortex, etc. However it is dubious whether there are any comparable biological events in adult life to those of early childhood. There are clearly physiological phenomena such as the menopause, but it has not yet been clearly established whether any connection exists between this and any cognitive changes. The assumption that the cause of a change from one stage to another is necessarily biological is a dubious one, particularly in the case of adults where so many different factors affect their cognitive state. Much of this discussion relates to the adult as a whole person which assumes that the cognitive dimension is often affected by other dimensions such as the economic, social or physiological.

There are a number of major, non-universal social events in adult life such as marriage, divorce, becoming a parent, being made redundant, being the victim of an assault or the death of a parent which might initiate such a change. Most of these experiences tend to be trauma-inducing, rather than intellect-stimulating. However a trauma can become positively stimulating if the person is determined to overcome that sadness and to become someone who is spiritually superior to what she was before the trauma. On the other hand being made redundant may lead to negative labelling by others and diminished self-esteem in the person.

A different type of event is overtly positive in its direction of motivation e.g. being promoted or obtaining a higher qualification.

The study of adult learning is (relatively) so new that this discussion remains speculative. There is not any convincingly established empirical evidence of a correlation between life events and intellectual change. Since Piaget's stage theory is hierarchically conceived, *a priori* it would seem most unlikely that qualitative growth in cognitive capacity could be triggered by an emotional trauma. Nevertheless this discussion is a necessary antidote to the obsessively cognitive nature of Piagetian research.

Piaget's stage theory

Piaget's stage theory and its relevance to adult learning will now be considered. There are four stages (or 'periods' as they are known technically):

- (1) sensori-motor activity i.e. using mainly the hands with no control by language – 0 to 2 years.
- (2) pre-operational activity – 2 to 7 years.
- (3) operational thought:
 - (a) concrete operations – 7 to 11 years.
 - (b) formal operations – 11 years onwards.

Inhelder and Piaget (1958) gave the impression that *all* children evolve from concrete to formal operational thinking at the age of 11. This has become enshrined in many text books. This claim has been strongly contested by a number of authors, both in the UK and other countries. Sutherland (1983), in a cross-sectional study across the school age range, found that in a comprehensive school in the UK less than half of the fifteen year olds were formal operational. Shayer *et al.* (1976), working at the same time as

Sutherland and in the field of science, came to the same conclusions, based on a larger sample. However Shayer *et al.* (1976) did find that an intellectual elite of 11 year olds in a grammar school or an A stream of a comprehensive school achieved formal operations at the age of 11, as asserted by Inhelder and Piaget. McNally (1970), testing Australian secondary pupils, came to similar conclusions, as did Biggs and Collis (1982). Cross (1981) also stated that most people never reach the highest stage.

Piaget himself did not extend his stages into the adult years. However he did (1967) argue that when a person ceases to use reflection to oppose experience and instead uses reflection to predict and interpret reality, they move from adolescence to adulthood. This transition could be a definition for researchers in the field.

In his concept of formal operations Piaget focused on both the internal state of the person's mind and on their experiences; the two interacting together make up maturation (as pointed out by Sternberg (1987)).

What is formal operational thought and how does it differ from concrete operational thought? In his dialectical account, Riegel (1973) has pointed out that formal operations involves the separation of thought from reality. In the process of formulating hypotheses, non-real possibilities need to be invoked which may be later tested against reality.

Peel (1972) added a great deal to our understanding of formal operational thought. He emphasized the ability to predict outcomes in superficially different situations. Within the Arts subjects he and his researchers developed a concept of *imaginative* thought, as opposed to the content-dominated thought of the concrete operational thinker (which he called *describer* thought). Peel emphasized that in all school subjects, imaginative judgements are comprehensive, compared to the partial and circumstantial observations of the describer stage. He added the term *explainer* thought – as an alternative to formal operations. This was justified since explainer thought mainly answers the question 'Why?'; whereas describer thinking answers the questions 'How?' and 'What are its features?' From this Sutherland (1983) evolved the *extended (or theoretical) explainer* stage to categorize adults who explain on the basis of a theoretical rationale.

Others have also extended the concept of a 'final' stage of formal operational thought. Michell and Lambourne (1979) had a similar *superior explainer* category. Another alternative was evolved by Biggs and Collis (1982) in the form of their SOLO taxonomy i.e. *Structure of Observed Learning Outcome*. This outlined a number of stages starting in early childhood and culminating in the *extended abstract* stage of adulthood.

According to Koplowitz (1978), there is a fifth level of cognitive development called 'unitary operations'. This is characterized by conceptualization of reality in a systems framework. It is synergistic and gestaltist in nature. The whole is always greater than the sum of its parts. Therefore the stress is on holistic concepts and personal knowledge.

There are many other academics who have extended Piaget's theories into the adult years. It is not the prime purpose of this paper to offer a complete discussion of this literature; but rather to offer a sample and then to consider the implications of these for teaching.

Other theorists of adult learning

In principle there is no reason why the search for regularities in cognitive development, which Piaget initiated for children, should not be applied to adults. This nettle has been

grasped by such neo-Piagetians such as Kohlberg (1969), Peel (1972) and Labouvie-Vief (1980).

An alternative strategy has been to synthesize Piaget's ideas with those of other theorists. This has been done by Kolb (1984), Loevinger (1976), Biggs and Collis (1982) and Pascual-Leone (1983).

A third alternative was to use a different methodology and theoretical background to Piaget's e.g. Perry (1970), and Entwistle (1985).

The neo-Piagetians

Kohlberg (1969) specialized in the moral strand of cognitive development in which Piaget (1932) was the pioneer. Kohlberg started with adolescence and evolved stages of development up through the early adult years.

The initial level is *preconventional* morality. The first stage of this involves acting to avoid punishment; the second stage is based on mutual benefit.

The second level is *conventional* morality. The first stage involves conforming to the norms of the peer group; the second is a mechanical conformity to the rules/laws of society.

The culminating level is *postconventional* morality. In the first stage of this an adult would negotiate terms with significant others; whilst in the second and final phases he would act independently of the norms if he thought it was right to do so.

In a large number of empirical studies done in many countries of the world, it emerged that most adults remain at the one or other of the two stages of conventional thought: either conformity to the norms of the group or an uncritical conformity to the rules of the institution.

According to Rogers (1986) Piaget and Kohlberg saw the goal of adult lifespan development as achieving rational autonomy. The ideal adult is an independent intellectual man, like Piaget and Kohlberg.

However this whole orientation was rejected by Gilligan (1982). She posed the question: to whom are we responsible for our moral behaviour? Piaget and Kohlberg imply that we are responsible not to other people, but to intellectual abstract principles of justice, etc. Gilligan does not agree, arguing that the groups to which people belong *do* matter. The role of a person within a group is not to be impervious to the influence of that group. Rather it is within the small group (such as a family or a work research team) that moral conduct is of the greatest importance. This conduct is interactive with other members of the group, rather than independent of the group. She agrees that altruism is amongst the supreme virtues, but it is a sacrifice of oneself for the sake of other people, rather than for an abstract principle.

Labouvie-Vief (1980) has made an invaluable contribution in applying Piaget's ideas to the mature adult. She emphasizes the mature adult's ability to relate abstract (formal operational) thought to everyday life. Whereas theorists of adolescence (e.g. Inhelder and Piaget (1958) and Peel (1972)) have emphasized the testing out of hypotheses, she comments (1980; 153)

'While the theme of youth is flexibility, the hallmark of adulthood is commitment and responsibility. Careers must be started, intimacy bonds formed, children raised. In short, in a world of a multitude of logical possibilities, one course of action must be adopted. This conscious commitment to one pathway and the

deliberate disregard of other logical choices may mark the onset of adult cognitive maturity.'

In other words whilst both Inhelder and Piaget and Peel implied divergent thinking in adolescents, Labouvie-Vief pointed to convergent thinking in adults.

She also pointed out (1977) that a mature adult sees contradictions in a different way to an adolescent. A contradiction is no longer a deficiency to be overcome, but a stimulus to intellectual creativity and innovation.

She argues against the decremental model of the lifespan in which there is an inevitable decline in the later years. Evidence for this model had been provided by Papalia and Bielby (1974) who had found that the senile elderly are no longer capable of conserving number, grasping object permanence, etc. An inverse *horizontal decalage* takes place. Instead Labouvie-Vief argued for a discontinuity model between childhood and adulthood, as also advocated by Rees (1973). In fact she argues (1980) that concrete thinking can be seen in an adult context as a specific solution to a particular problem. In other words it is an advanced and desirable pattern of behaviour rather than a regressive one.

However Papalia (1972) showed that mature adults can be superior to adolescents. Subjects in the 55 to 64 year group – when compared to other decades – attained the highest mean performance on tests of conservation of number, substance, weight and volume.

Like Kohlberg, Loevinger (1976) drew on Piaget's (1932) stages of moral development amongst other theoretical influences. She also drew on Piaget's concepts of cognitive development, linking these to the socio-cultural ideas of Erikson (1959). In particular she adopted Piaget's idea of an equilibrium: a state of balance which an adult reaches for each stage – until the equilibrium is upset by some internal or external event. The adult then has to re-accommodate and reassimilate in the higher stage until they reach a new (and higher) equilibrium.

Her stage theory is based on the Freudian concept of ego development, covering the whole lifespan. Her *presocial* level corresponded to Piaget's *anomy*. Her *impulsive* level had no Piagetian equivalent. Her *self-protective* level drew on Piaget's concept of *heteronomy*. Her *conformist* level too had no Piagetian equivalent; whilst her *conscientious-conformist* evolved out of Piaget's notion of *autonomy* and is based on cooperation and mutual respect. In a particular child it evolves to a state of equilibrium. Loevinger points out the paradox that children reach conscientious-conformism in games of marbles; yet at the same time this is the dominant mode of adult moral behaviour in our society.

However, her more advanced levels had no Piagetian equivalents. Like Kohlberg she added modes of thinking in adults which are morally more advanced than those of children: the conscientious, the individualistic, the autonomous and the integrated. Loevinger argued in favour of a link between Piaget's autonomy in children and conformism in adults.

As with Piaget's conception, the question remains as to what extent adults can be prompted or accelerated into a more 'mature' stage by the intervention of others such as therapists. Or do we just have to wait for this to happen via a process of maturation, when the person is 'ready'?

Pascual-Leone (1983), by reconciling Piaget's stage approach with Riegel's dialectical one, argued that there are four stages after formal operations: the *late formal*, the *predialectical*, the *dialectical* and the *transcendental*.

Experiential learning theorists

Kolb (1984) linked Piaget's stages to the notion of using experience-based curricula for adult learners. If we accept the original implication of Inhelder and Piaget (1958) that there is a universal transition to formal operational thinking at 11, there is a contradiction in Kolb's advocacy. According to Kolb, the adult student should be re-introduced to formal education by means of an experience-based curriculum which builds on the foundations of the adult's own life experiences and which is – by implication – concrete operational in approach. However, according to Inhelder and Piaget, the teaching of all adults calls for a formal operational method of learning. But, if the findings of Sutherland (1983) and others are accepted, Kolb's argument makes sense: teachers should start with a concrete-based curriculum, gradually moving through a concrete-abstract transition to a curriculum based on abstract concepts.

Sundry theorists

Perry (1970) studied intellectual growth longitudinally across the undergraduate years. In comparison with Piaget's definite stages, he stressed the relative nature of the changes and the importance of the transitions into and out of them.

A radical departure to Piaget's ideas would seem to be offered by Entwistle (1985). He argues that there are distinctive adult approaches to learning: the surface, the deep and the strategic. Surface learning probably has a similar place in Entwistle's (implied) hierarchy of learning to that of concrete operations in Piaget's outline. However the characteristics of surface learning are, of course, verbal and not at all concrete or practical. The deep approach can in some ways be seen as similar to formal operational thinking, although its intellectual origins are quite different.

Tennant (1988) regards the following aspects of Piaget's ideas as relevant to adult learning and development:

- (1) The emphasis on qualitative rather than quantitative developmental change.
- (2) The emphasis on the active role the adult plays in constructing her own knowledge.
- (3) The concept of formal operations as a mature adult mode of thought (although Inhelder and Piaget (1958) originally conceived it as applying to adolescents).

Conclusions

From the author's neo-Piagetian perspective it is argued that both Piaget's theory of knowledge and his stages of thinking are relevant to adults. In the latter case, either concrete or formal operations may apply. Even if an adult is functioning at a formal operational level, this type of thinking may have different characteristics from those in an adolescent.

Three perspectives derived from Piaget's ideas are offered in the paper: neo-Piagetian, theorists synthesizing Piaget's ideas with others and alternatives to Piaget. Each of these is seen as valid contribution in its own right. However no overarching consensus has emerged to synthesis the three perspectives.

Applications of Sutherland's Piagetian stages to teaching

According to Sutherland (1982) and Shayer *et al.* (1976), it cannot be assumed that all adults can think formal operationally. Therefore the capacity of a particular adult student to think in abstract (or formal operational) terms must be clearly ascertained before he is given highly 'academic' programmes of work by his teachers. Those who are entirely unable to think in this way and who are locked into a concrete operational way of thinking will need entirely different teaching methods, similar to those used for most primary school pupils. The stress would be on learning by doing and from visual material.

Students in the UK generally enter colleges of further education without achieving the same entry qualifications as for university (e.g. 3 'A' levels in England). In such colleges, teachers can assume that students are transitional between the concrete and formal operational levels. Therefore teaching could start with a preliminary theoretical outline; to be followed by a strong practical application (concrete operational level). The lecturer could return to the theoretical level at the end of a topic. This is on the assumption that the students have successfully made the transition from concrete to formal operations. This, for example, is a model which is used in teaching tourism courses for the Higher National Diploma in Scotland.

A similar argument applies to training programmes. The learning is almost all concrete and practical. Theoretical outlines are rare and probably unnecessary for most jobs; therefore there is no need for a transition. Teaching could remain at the concrete level.

Traditional university teaching has been clearly based on Piaget's formal operational level. However the proportion of the age cohort going on to university is increasing continually in the UK (Osborne and Gallacher 1997) and many other countries. Can teachers continue to assume that *all* students are necessarily *fully* formal operational, even if they have the required academic entry qualifications for university?

Those who have some, inconsistent ability to think in an abstract way will need support from their teachers if they are to become consistent abstract (formal operational) thinkers. Sutherland's (1992) notion of a *transition* between concrete and formal operations then has implications for teachers. Those students who have reached university without becoming fully formal operational or who have chosen a new subject in which they struggle to think formal operationally may require help from their teachers. This could aim at either:

- (1) offering the course material at a concrete level; then only gradually moving on to a more abstract approach; or
- (2) for those who are *almost* formal operational, consolidating the abstract concepts and theories.

All the applications above assume: (1) the UK structure and (2) an advanced society. However the basic argument could apply equally in other educational structures and even more strongly in less economically advanced societies. Where there is no universal secondary education, there is an even greater need *not* to assume that abstract methods of teaching can always automatically be used. In developing societies the basic Piagetian message seems particularly relevant: if a teacher is not sure whether an adult learner is functioning at a formal operational level or not, it is safer to start by using the adult learner's personal practical experiences (or, if these do not exist, providing some for her); before moving from this to generalized abstract approaches.

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